CETHA-BC-CR-90090

USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Report of Sampling and Analysis Results

Wakefield Army Housing Units
Wakefield, Massachusetts

August 1990

Prepared for:

U.S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY
Aberdeen Proving Ground
Maryland 21010-5401

Prepared by:

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Under the supervision of:

Environmental Assessment and
Information Sciences Division
Argonne National Laboratory
Argonne, Illinois 60439

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Roy F. Weston, Inc. has conducted a sampling and analysis program of the Army housing property located in Wakefield, Massachusetts. The objectives of this effort include further characterization of environmental contamination identified in an enhanced preliminary assessment carried out in 1989. The specific activities performed at this site were identification, evaluation of the condition, and collection of samples from specific suspected asbestos-containing materials, including floor tiles, pipe run and pipe fitting insulation, dust in the ductwork, and exterior siding, where present. These evaluations were necessary to clarify potential environmental issues identified in the earlier report, prior to the sale or realignment of the property.

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SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY WAKEFIELD, MASSACHUSETTS

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EXECUTIVE SUMMARY

The U.S. Army family housing units (FHUs) at Wakefield, Massachusetts were inspected by Roy F. Weston, Inc. (WESTON) personnel during February 1990 to further evaluate the environmental concerns identified in the enhanced Preliminary Assessment reports prepared and submitted earlier by Argonne National Laboratory (ANL) for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). Three of the 12 single-family "MCA" housing units were examined on 07 February to investigate the possible presence of asbestos-containing materials (ACM).

The ANL Draft Sampling and Analysis Plan, Revision 1 (SAP) specified identifying and sampling the following materials, that frequently are suspected to contain asbestos, from ten per cent of the housing units or a minimum of three, whichever is greater:

- Pipe run insulation.
- Dust accumulated inside heating ductwork within the concrete slab, where present and open.
- Vinyl floor tiles.

The WESTON personnel selected three housing units for inspection after review of maintenance records and drawings, discussions with housing management personnel, and determination that all the units were in similar condition. The housing units chosen, Nos. 009, 011, and 012, were considered to be representative of the other nine units but this was not confirmed by an examination of all the units.

Two samples of dust were collected from one unit and 13 samples of vinyl floor tile were collected by WESTON from three units and analyzed. These analyses revealed that asbestos is present in dust accumulated within the heating ductwork in one housing unit and in floor tile at the three housing units examined. Asbestos was found in both of the dust samples. Asbestos was quantified at 1% or greater by polarized light microscopy (PLM) in nine of the floor tile samples, and quantified at less than 1% in two samples of the floor tile. Asbestos was qualitatively identified in two other samples by transmission electron microscopy (TEM). No pipe insulation samples were collected since the pipes in the units examined were not insulated. Dust samples were not collected in two units because all floor vents had been permanently sealed. During the asbestos sampling activity. Other suspect materials observed were roof shingles and felt.

The following practices should be observed with regard to the known and suspected asbestos-containing materials identified:

- The risks posed by the asbestos-containing dust in the ductwork cannot be clearly evaluated, since the program only called for a qualitative screening of this material since no approved quantitative procedure exist. However, since the ducts are inactive, the risk of exposure is minimal.
- The vinyl floor tiles pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. They should be managed in place under an Operations and Maintenance (O&M) plan which describes procedures for the regular inspection of the floor tiles and the removal and replacement of any that become damaged.

SECTION 1. INTRODUCTION

SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY WAKEFIELD, MASSACHUSETTS

SECTION 1. INTRODUCTION

Roy F. Weston, Inc. (WESTON) was retained by Argonne National Laboratory (ANL) to provide assistance in gathering additional environmental data for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) at 53 family housing unit properties (FHUs) in 12 states. The Wakefield, Massachusetts property is one of these FHUs.

1.1 PURPOSE AND SCOPE

The purpose of this project was to provide the Department of the Army with sound environmental data on the property which is scheduled for sale or realignment as a result of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526). Environmental assessments of each property covered by the Act are required by the Secretary of Defense prior to their closure or realignment. Such actions must be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA) and to ensure that any environmental hazards will be identified and mitigated where required.

Previously, ANL conducted enhanced preliminary assessments (PAs) for each property. These enhanced PAs made recommendations regarding sampling and analysis to determine (1) whether and in what quantities asbestos is present in certain building construction materials (including pipe run insulation, dust accumulated in heating ductwork, vinyl floor tile, and exterior siding shingles, where present), (2) in selected contexts, whether and in what concentration soils and groundwater may be contaminated, and (3) whether and in what range transformer oils at selected sites may contain polychlorinated biphenyls (PCBs). WESTON gathered this data by implementing Argonne National Laboratory's (ANL's) Draft FHU Sampling and Analysis Plan, Revision 1 (SAP).

1.2 SITE DESCRIPTION

The Department of the Army's FHU property in Wakefield, Massachusetts consists of 12 single-family units located on 4.0 acres and situated along Tarrant Lane. The areas surrounding these FHU are residential properties.

The units at this FHU property are three bedroom, single-family dwellings built in the late 1950's, in the "MCA" style. The single-story, wood-frame units were constructed on concrete slab foundations with no basements or crawl spaces. The ducts for the original heating system is embedded in the concrete slab, which was covered with vinyl floor tile. The units have pitched roofs surfaced with asphalt shingles and exteriors finished with vinyl siding.

1.3 REPORT ORGANIZATION

This report contains the results of the sampling and analysis program performed by WESTON. Section 2 contains a description of the asbestos sampling performed at the property and laboratory results for samples of suspected asbestos-containing material (ACM) collected. Copies of field notes and laboratory results pertaining to asbestos are provided in Appendices A.1 and A.2.

SECTION 2. ASBESTOS-CONTAINING MATERIALS

SECTION 2. ASBESTOS-CONTAINING MATERIALS

WESTON personnel inspected three of the 12 "MCA" units at the Wakefield family housing facility on 07 February 1990 for the presence of suspected ACM. Vinyl floor tile and dust within the ductwork were the only suspect materials found within the buildings that were sampled. All sampling was done following the requirements of ANL's SAP. Additionally, all field work was performed in accordance with applicable Federal regulations, including 40 CFR Part 61 subpart M, 40 CFR Part 763 subpart E, and 29 CFR Part 1910.1001.

2.1 SAMPLING RATIONALE

The sampling rationale used by WESTON for this project followed the recommendations set forth by ANL. The type of suspect ACM to be sampled, the number of housing units to be examined at each FHU facility, and number of samples to be taken for each material found were described in the SAP. The plan for Wakefield required sampling of the following materials, if present:

- Pipe run insulation.
- Accumulated dust inside heating ductwork if not sealed.
- Vinyl floor tiles.

In accordance with the SAP, three units were examined at this facility. The sampling plan, however, did not identify specific units which were to be sampled. The task of determining which housing units were representative of the facility as a whole and, therefore, would be sampled was left to the WESTON field team. After reviewing all available maintenance records and drawings and discussing the facility with Directorate of Engineering and Housing (DEH) personnel, it was determined that all of the units at the Wakefield FHU were similar in condition. Units 009, 011, and 012 were chosen by the WESTON field team leader as representative units to be sampled.

The SAP specifies that a minimum of two pipe run insulation samples, four dust samples, and one sample of each color of floor tile be collected from each of the housing units examined. Thirteen samples of vinyl floor tile were collected at the facility. The total specified number of dust samples were not collected because all but two floor vents has been permanently sealed. Therefore, only two dust samples were collected. No pipe insulation samples were collected since the pipes in the units examined were not insulated.

2.2 FIELD ACTIVITIES AND OBSERVATIONS

Each of the three units was inspected to determine if suspect materials were present. Samples of the dust in the ductwork were collected by wiping the inner surface of the duct near the designated exhaust vents with a fiber-free wipe selected for its ability to trap dust in a non-fibrous matrix. Each wipe was placed in the jaws of a flexible small parts pick-up tool and moistened with fiber free water. If grille openings were too small, the grille was then removed and the tool inserted into the duct opening. The interior surface was wiped to collect dust on the moistened surface of the wipe. After the dust was gathered, the wipe was placed in a small plastic wide-mouth jar, sealed, labeled with the sample number, and shipped to the lab. The grille was then replaced and the tool was cleaned by rinsing and wet wiping the surfaces prior to collecting the next sample. Samples were collected from the living room and one bedroom in Unit 011.

Six colors (black, blue, white, gray with dark streaks, and two other types of gray) 9" x 9" vinyl floor tile and one color (brown) 12" x 12" vinyl floor tile were sampled. All three units contained brown 12" x 12" vinyl floor tile and gray 9" x 9" vinyl floor tile. Units 011 and 012 also contain black 9" x 9", blue 9" x 9", and an additional gray 9" x 9" vinyl floor tile. Unit 009 also contains white 9" x 9" vinyl floor tile. One sample was taken of each of the floor tiles found in each housing unit resulting in a total of 13 samples for laboratory determination of asbestos content. These samples were collected by breaking off a small piece of floor tile in an inconspicuous location. About one square inch of the tile surface area was taken for each sample. No effort was made to separate the mastic, which sometimes contains asbestos, from the floor tile samples themselves.

The vinyl floor tile in all three of the units inspected was in good condition. This material is considered to be a non-friable type of ACM, unless damaged. If significant damage occurs, such that the material becomes friable as defined in the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP), the U.S. Environmental Protection Agency (EPA) would classify these tiles as friable materials. However, an EPA opinion was recently released that changes certain previous interpretations regarding non-friable ACM. On 23 February 1990, a memorandum was issued by the Director of Emissions Standards Division, the Director of Stationary Source Compliance Division, and the Associate Enforcement Counsel for Air Enforcement of the EPA Office of Air Quality Planning and Standards (OAQPS). This memorandum was circulated to other air quality officials and EPA regional offices in early March 1990. This latest position states that floor tiles and certain other non-friable materials do not have to be removed from a facility prior to demolition, unless they are severely damaged and thus are considered friable, or unless the demolition may cause fiber release through grinding or abrasion of the tiles. Floor tile removal shall be done if demolition is to be accomplished by burning, either of the unit or of the debris from demolition. However, if the floors in the housing units are to be renovated, special care must be taken during the process to prevent the release of asbestos fibers.

The WESTON field team was directed, as a part of the project scope contained in the SAP, to perform sampling and analysis of specific suspect ACM. Other suspect materials observed were roof shingles and felt. Copies of the field notes are included in Appendix A.1.

2.3 LABORATORY PROCEDURES AND RESULTS

The bulk samples of building materials were analyzed for asbestos content by WESTON's optical microscopy laboratory in Auburn, Alabama. This laboratory is accredited by the American Industrial Hygiene Association (AIHA) and the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). The bulk samples were analyzed by Polarized Light Microscopy (PLM) using the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, December 1982. Copies of the laboratory reports are included in Appendix A.2.

Vinyl floor tile samples for which no asbestos was found using PLM methods were analyzed qualitatively for the presence of asbestos by Transmission Electron Microscopy (TEM) at WESTON's NVLAP accredited electron microscopy laboratory in Auburn, Alabama. Copies of these laboratory reports are also included in Appendix A.2.

All analyses were performed in accordance with protocols set forth in the Laboratory Accreditation package submitted by WESTON under NVLAP. This document includes standard procedures for sample analysis and quality assurance / quality control (QA/QC) which were acceptable to NIST. The QA/QC protocols for the laboratory differ significantly from those commonly found in chemical analysis procedures, due to the nature of the analytical procedure. Since there are no reagents, digestions, or other steps in the process that provide significant opportunities for sample contamination or analyte loss, lot blanks and sample spikes are not performed. Instead, all analyses are performed using the following steps:

- Incoming samples are divided into lots of ten for analysis.
- One sample is selected at random to serve as the QC check and divided into two containers.
- The sample lot is assigned to an analyst who determines the asbestos content of each sample.
- The QC sample is analyzed by a different analyst, designated by the sample custodian.
- The results of both analysts are submitted to the QC Coordinator for review, and comparison to the laboratory QC chart.
- The results are reviewed and approved, based on the written QC review procedures, or rejected. If rejected, the sample lot and QC sample are reanalyzed.

The WESTON laboratory routinely runs blank checks to ensure that equipment and refractive index oils are not contaminated, collects and analyzes samples of the air in the work areas to document that airborne asbestos fibers do not threaten worker health or sample contamination, and analyzes samples submitted by NIST to document precision of results as required by the NVLAP program. Samples provided in past rounds of proficiency checks are used for analyst training and to document analyst proficiency. The use of third party laboratory comparisons is often done, and is accomplished by sending duplicates of samples to an outside laboratory and comparing the results obtained by the two facilities.

In interpreting the asbestos results, it should be noted that the definition of asbestos presence differs between the EPA and some state agencies. According to the EPA definition, any materials that contain greater than one per cent (>1%) asbestos are classified as ACM by the 1977 NESHAP regulations. However, California has recently implemented state regulations that consider all materials containing 0.1 per cent (%) or more asbestos as asbestos-containing. It is believed that several other states will soon follow the lead of California in lowering the threshold limit to 0.1 per cent, including some in which properties under review in this study are located. Currently, the State of Massachusetts continues to abide by the EPA definition. Hence, all samples containing >1% asbestos are considered to be ACM.

The matter is further complicated by the fact that the PLM method was developed specifically for friable materials, but not for non-friable types of suspect ACM such as vinyl floor tiles, vinyl sheeting, and siding. In fact, no specific method has been developed and promulgated to date for such samples, so laboratories use PLM as the only available documented procedure for their analysis. PLM has an inherent limitation on fiber resolution of about 0.25 micrometer (um) in diameter and reliable detection and quantification of fibers smaller than 1 um in diameter is difficult. The manufacturing process for vinyl floor tiles, for example, results in the very small fiber diameters which often cannot be seen by PLM. WESTON's

experience is that frequently such samples do, in fact, contain significant quantities of asbestos. WESTON has developed a qualitative technique using TEM to detect the presence of such small fibers and minimize false negatives in the laboratory results. This technique, however, does not allow a good quantitative estimate of asbestos content.

For these reasons, the WESTON laboratories have implemented a policy of reporting asbestos presence as follows:

- Asbestos determined by PLM to be present at greater than 1% is reported as the quantity detected.
- If asbestos is estimated to be less than 1% by PLM, it is reported as <1%. This estimate of asbestos content may be made when only one asbestos structure is observed.
- If asbestos is not detected in certain non-friable materials by PLM, then the samples are subjected to TEM analysis. The results are reported as positive if asbestos is detected by TEM.

Recommendations made in this report are based on the >1% regulatory limit, except for floor tiles as discussed earlier and except as otherwise noted. However, all samples in which asbestos is observed are discussed. This represents a conservative approach to the assessment of asbestos presence at the facility.

Table 2.1 contains a summary of all samples collected at the Wakefield FHU, including sample locations, material descriptions, and laboratory results. PLM results are quantitative while TEM results are qualitative only. Quantity estimates for materials sampled that were suspected to contain asbestos are presented in Table 2.2. The field notes describing the observations are provided in Appendix A.1, while copies of the original laboratory reports are included as Appendix A.2.

Nine samples of the floor tile were found by PLM to contain asbestos at or greater than the 1% level. WESTON considers the 1% value reported for samples AP-454-21-MA-011-AFT and AP-453-21-MA-011-AFT to be sufficient to define the samples as asbestos-containing due to the analytical uncertainty of the PLM method when applied to floor tiles, as described previously. Two other samples were found by PLM to contain asbestos, but at a concentration of <1%. Two of the samples, for which no asbestos was reported following PLM analysis, were found to contain asbestos fibers by the TEM procedure. While this result is qualitative in nature, consideration of the process through which floor tiles were manufactured leads to the conclusion that this material should be treated as ACM. Thus, all of the floor tile samples were found to contain asbestos. The nine units not inspected should be considered to have ACM present in the floor tiles unless additional sampling and analysis is performed and shows that no asbestos is present in these units.

Analytical results for the dust samples taken from the heater ductwork in one unit indicated that this dust contains some asbestos fibers. Qualitative TEM analyses revealed the presence of asbestos in both the dust samples.

TABLE 2.1
BULK SAMPLE SUMMARY
WAKEFIELD FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	ASBESTOS CONTENT PLM ANALYSIS	CONFIRMATION TEM ANALYSIS
Unit 011				
AP458-21-MA-011-ATD	Dust within ductwork	Bedroom 1	---	Positive
AP459-21-MA-011-ATD	Dust within ductwork	Living room	---	Positive
AP457-21-MA-011-AFT	Black 9" x 9" floor tile	Bedroom 2	Chrysotile, 7%	
AP456-21-MA-011-AFT	Brown 12" x 12" floor tile	Kitchen	Chrysotile, <1%	
AP455-21-MA-011-AFT	Blue 9" x 9" floor tile	All rooms except kitchen	Chrysotile, 20%	
AP454-21-MA-011-AFT	Gray 9" x 9" floor tile	Patch throughout unit	Chrysotile, 1%	
AP453-21-MA-011-AFT	Gray 9" x 9" floor tile	Patch throughout unit	Chrysotile, 1%	
Unit 012				
AP460-21-MA-012-AFT	Brown 12" x 12" floor tile	Kitchen	None Detected	Positive
AP461-21-MA-012-AFT	Gray 9" x 9" floor tile	Patch throughout unit	Chrysotile, 4%	
AP462-21-MA-012-AFT	Gray w/dk streaks 9" x 9" floor tile	Over floor vents	None Detected	Positive
AP463-21-MA-012-AFT	Blue 9" x 9" floor tile	All rooms except kitchen	Chrysotile, 17%	
AP464-21-MA-012-AFT	Black 9" x 9" floor tile	Patch throughout unit	Chrysotile, 3%	
Unit 009				
AP465-21-MA-009-AFT	Brown 12" x 12" floor tile	Kitchen	Chrysotile, <1%	
AP466-21-MA-009-AFT	White 9" x 9" floor tile	Over floor vents	Chrysotile, 2%	
AP467-21-MA-009-AFT	Gray 9" x 9" floor tile	All rooms except kitchen	Chrysotile, 20%	

TABLE 2.2
ASBESTOS CONTAINING MATERIALS
WAKEFIELD FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	QUANTITY	UNITS
Unit 006				
AP458-21-MA-011-ATD	Dust within ductwork	Bedroom 1	N/A	
AP459-21-MA-011-ATD	Dust within ductwork	Living Room	N/A	
AP457-21-MA-011-AFT	Black 9" x 9" floor tile	Bedroom 2	10	Square ft
AP456-21-MA-011-AFT	Brown 12" x 12" floor tile	Kitchen	90	Square ft
AP455-21-MA-011-AFT	Blue 9" x 9" floor tile	All Rooms except Kitchen	950	Square ft
AP454-21-MA-011-AFT	Gray 9" x 9" floor tile	Patch throughout unit	10	Square ft
AP453-21-MA-011-AFT	Gray 9" x 9" floor tile	Patch throughout unit	10	Square ft
Unit 012				
AP460-21-MA-012-AFT	Brown 12" x 12" floor tile	Kitchen	90	Square ft
AP461-21-MA-012-AFT	Gray 9" x 9" floor tile	Patch throughout unit	10	Square ft
AP462-21-MA-012-AFT	Gray w/dk streaks 9" x 9" floor tile	Over floor vents	10	Square ft
AP463-21-MA-012-AFT	Blue 9" x 9" floor tile	All Rooms except Kitchen	950	Square ft
AP464-21-MA-012-AFT	Black 9" x 9" floor tile	Patch throughout unit	10	Square ft
Unit 009				
AP465-21-MA-009-AFT	Brown 12" x 12" floor tile	Kitchen	90	Square ft
AP466-21-MA-009-AFT	White 9" x 9" floor tile	Over floor vents	10	Square ft
AP467-21-MA-009-AFT	Gray 9" x 9" floor tile	All Rooms except Kitchen	950	Square ft

2.4 CONCLUSIONS AND RECOMMENDATIONS

The sample analyses performed by WESTON have revealed that asbestos is present in the dust accumulated within the heating ductwork in one unit, and in the vinyl floor tiles in the three units examined. These units are thought to be representative of the other nine at the site, but this was not confirmed by an examination of all the units.

The asbestos dust accumulated within the heating ductwork represents an unusual problem, since the source of this asbestos is not readily apparent, and the quantity is not precisely known. Since the heating system is no longer in use, no further action appears to be necessary at this time. Precautions should be taken to ensure that the dust is not disturbed in the future.

The source of the asbestos in the ducts cannot be positively determined, due to the sampling and analysis procedures employed. However, there are several potential sources, based on observations at the numerous facilities inspected during this project. Units, presumed to be the original heaters, found at other facilities frequently contained an expansion joint which served to isolate the return air plenum from the heater itself, preventing the transmission of vibrations and noise to the ductwork. The fabric-like material used to form this joint was determined, in some cases, to be chrysotile asbestos in a nearly pure form. It is possible, even likely, that the heating systems in these units had similar expansion joints which have been removed. During the 25 to 30 years that the original units were in service, erosion of these joints was likely, and could have caused asbestos fibers to accumulate in the dust.

Another possibility is that residual debris from the removal of vinyl-asbestos floor tiles, such as was found in other sites, may have been left in the ducts during floor tile removal and replacement. Conversations with the TEM analysts indicate that there was some evidence of chlorine observed during the identification of the asbestos fibers by X-ray dispersion analysis in samples from some sites. The most likely source of this element, considering the site history, is the vinyl chloride polymer which forms the floor tile matrix. However, other asbestos sources, such as debris imported into the facilities from outside activities of the occupants, cannot be ruled out.

The vinyl floor tiles in the three housing units inspected were in good condition, but, should they become broken or damaged, asbestos fibers may be released. The recent EPA clarification of the definition for damaged non-friable materials apparently removes some concerns about the status of these materials at the time of renovation or demolition. Inspection of these normally non-friable materials prior to demolition is required, but, if they are in good condition at the time, they may be left in place as long as planned demolition procedures will not release a significant amount of asbestos fibers. However, if demolition will subject these non-friable materials to grinding, sanding, or abrading, or if demolition involves burning of the structure or debris from the structure, all forms of ACM, including these floor tiles, must be removed in advance.

The vinyl floor coverings should be left in place and managed under an Operations and Maintenance (O&M) plan. An O&M plan must address the following:

- The locations of all known and suspected ACM.
- The procedures and frequency for periodically assessing the ACM in the facility.
- The procedures for safely handling the ACM during maintenance or removal activities.
- Designation of an asbestos coordinator for the facility.
- The responsibilities and requirements for training of personnel involved with maintenance and renovation of the facility.
- The record-keeping program for the facility.

The vinyl floor tiles should be removed during a planned renovation of the units, in accordance with the regulations applicable at the time.

Other suspect materials noted were roof shingles and felt. Care should be taken during renovations or demolition to identify suspect materials that may have been hidden from the view of the assessment team. The suspect materials observed by the field team, and any hidden suspect materials found later, should be analyzed for the presence of asbestos prior to being disturbed.

APPENDIX A.1. FIELD DATA

0093

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. WAKEFIELD / 11 TARRANT Lane.

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert Lynch

TECHNICIAN NAME _____ SIGNATURE _____

TIME ARRIVED 0915 TIME DEPARTED 0945 DATE 07/FEB/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This was one story home with blue aluminum siding. The roof has asphalt shingles and roofing felt. Old vents in living room have been sealed. No vents are present in the bathroom. There is floor tile throughout home, under carpet. There are five types of tile present. There is no pipe insulation present. The actual address is 11 Tarrant Lane, Wakefield, Ma.

This is an "MCH" style home. It was chosen based upon available drawings, maintenance records, and discussions with housing management personnel.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	7
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	0	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE _____ DATE 1/90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

0095

BLDG. NO.: 011
INSTALLATION 021

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: WAKEFIELD FAMILY HSG
BLDG. DESCRIPTION: "ARCA" style

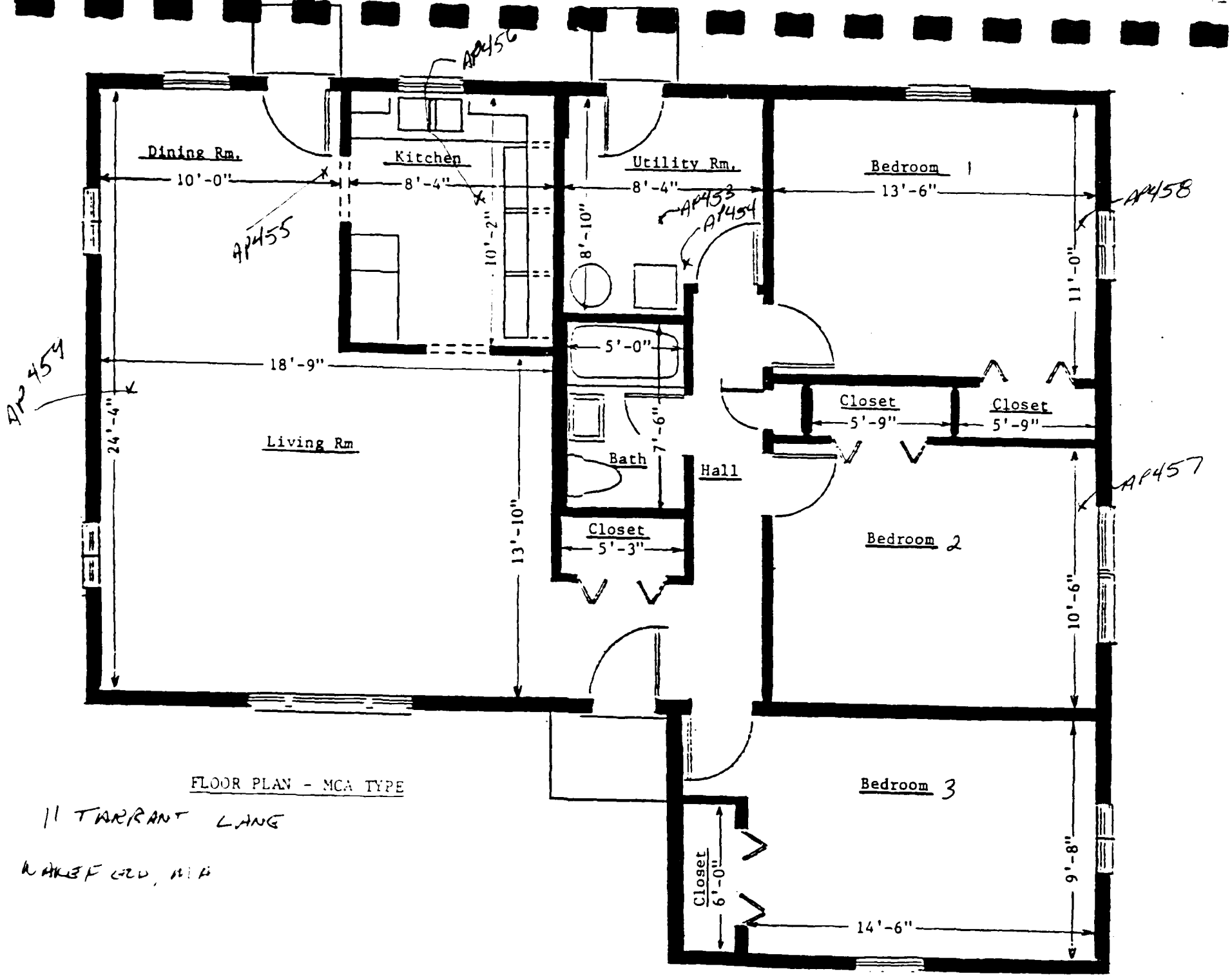
DATE (dd/mm/yy): 07/02/90
TIME ARRIVED: 0915

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP4558	21	MA	011	AIFT	BEDROOM 1	N/A	_	09B/1A	01
2.	AP4559	21	MA	011	AIFT	LIVING ROOM	N/A	_	09B/1A	01
3.	AP4557	21	MA	011	AIFT	BEDROOM 2	10	_	09B/1B	02
4.	AP4556	21	MA	011	AIFT	KITCHEN	90	_	09B/1C	03
5.	AP4555	21	MA	011	AIFT	ALL FLOORS EXCEPT KIT.	950	_	09B/1D	04
6.	AP4554	21	MA	011	AIFT	HEATING ROOM PATCH	10	_	09B/1E	05
7.	AP4553	21	MA	011	AIFT	PATCH	10	_	09B/1E	06
8.					AI			_		
9.					AI			_		
10.					AI			_		
11.					AI			_		
12.					AI			_		

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	dust sample from old air ducts in floor
02	9x9 black floor tile used to patch areas throughout house.
03	12x12 brown floor tile in kitchen only
04	9x9 blue floor tile in all rooms except kitchen. This is the predominant tile in house.
05	9x9 gray with white streaks, used to patch areas
06	9x9 gray with black streaks used to patch areas.

TECHNICIAN SIGNATURE Robert L Lynch

QUALITY ASSURANCE SIGNATURE _____



FLOOR PLAN - MCA TYPE

11 TARRANT LANE

OAKLEY CED, MA

0097

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. WAKEFIELD #12 TARRANT LANE

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert Lynch

TECHNICIAN NAME _____ SIGNATURE _____

TIME ARRIVED 0945 TIME DEPARTED ~~0977~~ 1015 DATE 07/FEB/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a one story MCA style home. with white aluminum siding. The roofing shingles/felt are suspect. All air ducts in the floor have been sealed. There is no pipe insulation present. There are types of tile present.

This is an "MCA" style home. It was chosen based upon available drawings, maintenance records, and discussions with housing management personnel.

The actual address is 12 Tarrant Lane, Wakefield, MA.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	5
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	6	Exp. Assess. Form Init	✓

Q.A. Check ____ SIGNATURE _____ DATE _____ 90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

0099

BLDG. NO.: 01/12
INSTALLATION 02/1

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: WAKEFIELD FAMILY HSG.
BLDG. DESCRIPTION: MCA STYLG

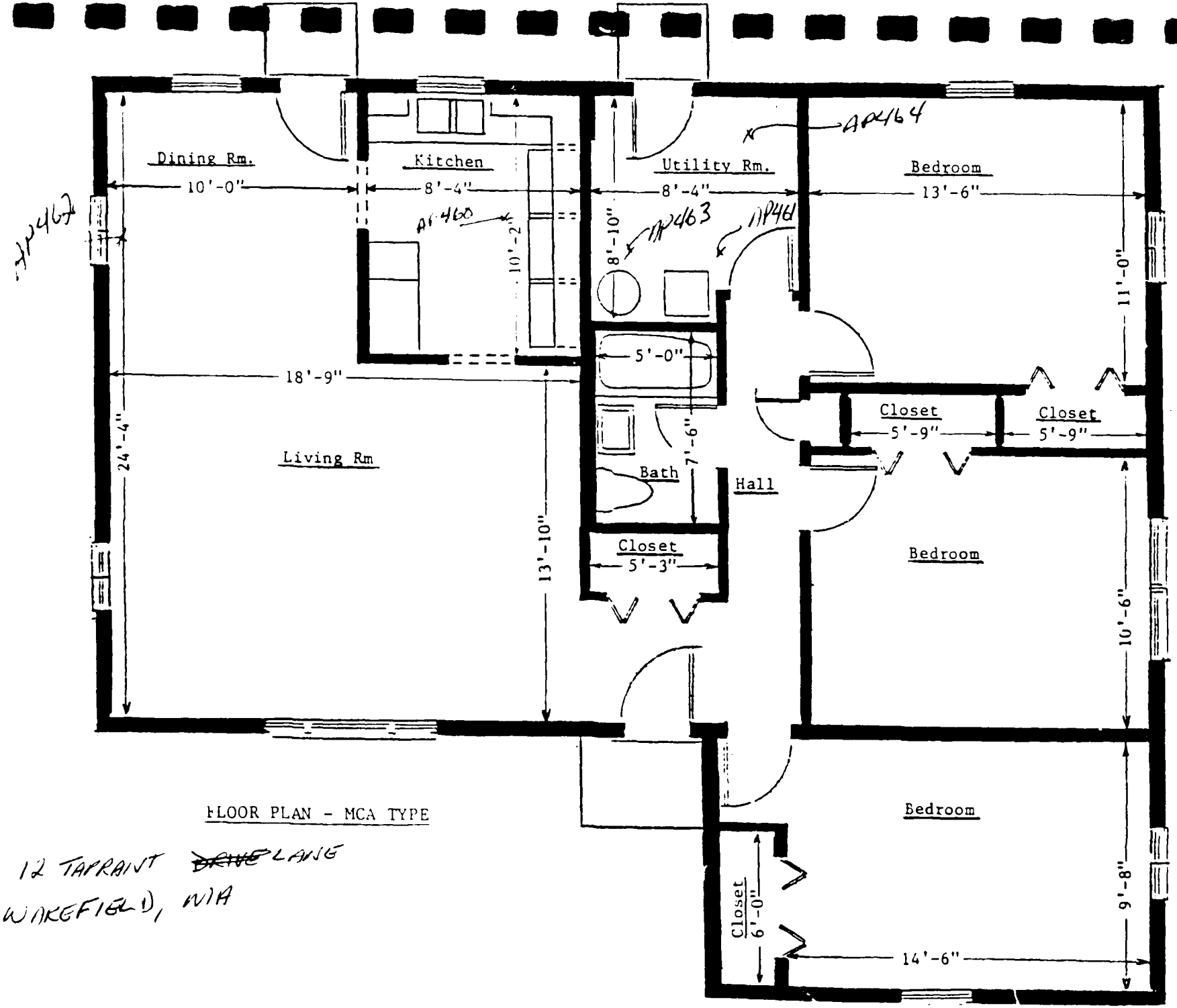
DATE (dd/mm/yy): 02/02/90
TIME ARRIVED: 0945

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	APH60-21-MA-01/12-AIFT					KITCHEN	190	-	09B2A	01
2.	APH61-21-MA-01/12-AIFT					PATCH	1/0	-	09B2B	02
3.	APH62-21-MA-01/12-AIFT					OVER VENTS	1/P	-	09B2C	03
4.	APH63-21-MA-01/12-AIFT					ALL ROOMS EXCEPT KIT	915P	-	09B2D	04
5.	APH64-21-MA-01/12-AIFT					PATCH	1/P	-	09B2E	05
6.	-1-1-11-AI						111	-	1111	1
7.	-1-1-11-AI						111	-	1111	1
8.	-1-1-11-AI						111	-	1111	1
9.	-1-1-11-AI						111	-	1111	1
10.	-1-1-11-AI						111	-	1111	1
11.	-1-1-11-AI						111	-	1111	1
12.	-1-1-11-AI						111	-	1111	1

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 brown floor tile in kitchen only
02	9x9 grey floor tile used to patch areas.
03	9x9 grey with dark streaks over vents (old air duct vents.
04	9x9 blue floor tile in all rooms, except kitchen.
05	9x9 black floor tile used to patch areas in front.

TECHNICIAN SIGNATURE Robert Lynch

QUALITY ASSURANCE SIGNATURE



FLOOR PLAN - MCA TYPE

12 TARRANT ~~DRIVE~~ LANE
WAKEFIELD, MA

0101

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. WAKEFIELD, MA 9 HOPKINS ~~ST~~ ST.

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-2551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert J Lynch

TECHNICIAN NAME _____ SIGNATURE _____

TIME ARRIVED 1030 TIME DEPARTED ~~HCC~~ 1045 DATE 07 FEB 90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a one story 3 bedroom home with grey aluminum siding. The roof has wood shingles and felt. There is no pipe insulation present. All of the old air duct vents have been sealed. There are two types of floor tile present.

This was a MCH style home. It was chosen based upon available drawings, maintenance records, and discussions with housing management personnel.

The actual address is 9 Hopkins St. Wakefield, Ma.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	3
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	0	Exp. Assess. Form Init.	✓

Q.A. Check _____ SIGNATURE _____ DATE ___/___/90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

0103

BLDG. NO.: 0109
INSTALLATION 0211

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: WAKEFIELD FAMILY HSG
BLDG. DESCRIPTION: MCM STYLE

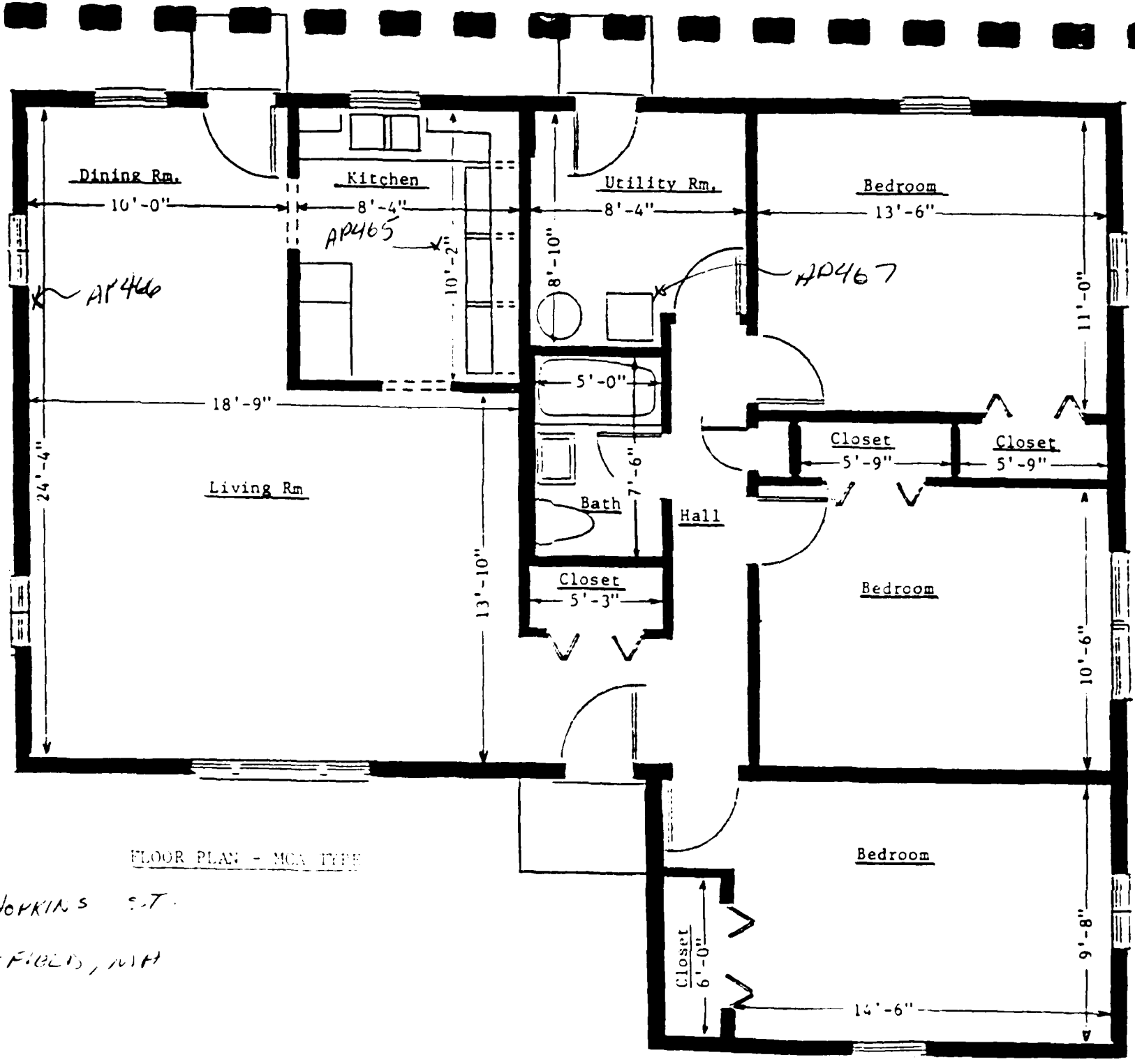
DATE (dd/mm/yy): 07/02/90
TIME ARRIVED: 1530

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO	NOTES
1.	12[illegible]65-21-MA-0109-AFT					KITCHEN	190	-	0983A	01
2.	12[illegible]66-21-MA-0109-AFT					CLOSET VENTS	110	-	0983B	02
3.	12[illegible]67-21-MA-0109-AFT					ALL ROOMS (EXCEPT KIT)	950	-	0983C	03
4.	____-__-__-____-AI__						____	-	____	__
5.	____-__-__-____-AI__						____	-	____	__
6.	____-__-__-____-AI__						____	-	____	__
7.	____-__-__-____-AI__						____	-	____	__
8.	____-__-__-____-AI__						____	-	____	__
9.	____-__-__-____-AI__						____	-	____	__
10.	____-__-__-____-AI__						____	-	____	__
11.	____-__-__-____-AI__						____	-	____	__
12.	____-__-__-____-AI__						____	-	____	__

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 brown floor tile in kitchen only
02	9x9 white ~~tiles~~ vinyl asbestos floor vents.
03	9x9 grey floor tile in all rooms except kitchen.

TECHNICIAN SIGNATURE Robert L Lynch

QUALITY ASSURANCE SIGNATURE _____



FLOOR PLAN - MCA TYPE

9 HOPKINS ST.

WAKEFIELD, MA

APPENDIX A.2. LABORATORY DATA

BULK SAMPLE ANALYSIS SUMMARY

Weston W.O. No. 2104-13-01-0000

Sample Number AP453 through Sample AP467

AO LAB ID NO	CLIENT/CLIENT ID	LOCATION	MATERIAL DESCRIPTION*	DATE RECEIVED	RESULTS** CH	AM	CR	OT	TL	LAYERS	ANALYST
AP453	21-MA-011-AFT	PATCH	NF, GY, 9X9 FT	02/12/90	1	ND	ND	ND	1	Yes	07323
AP454	21-MA-011-AFT	PATCH	NF, GY, 9X9 FT	02/12/90	1	ND	ND	ND	1	Yes	07323
AP455	21-MA-011-AFT	ALLRMS	NF, BL, 9X9 FT	02/12/90	20	ND	ND	ND	20	Yes	07323
AP456	21-MA-011-AFT	KITCHN	NF, BR, 12X12 FT	02/12/90	<1	ND	ND	ND	<1	Yes	07323
AP457	21-MA-011-AFT	BEDRM2	NF, BK, 9X9 FT	02/12/90	7	ND	ND	ND	7	Yes	07323
AP460	21-MA-012-AFT	KITCHN	NF, BR, 12X12 FT	02/12/90	ND	ND	ND	ND	ND	No	07323
AP461	21-MA-012-AFT	PATCH	NF, GY, 9X9 FT	02/12/90	4	ND	ND	ND	4	Yes	07323
AP462	21-MA-012-AFT	OVERVE	NF, GY, 9X9 FT	02/12/90	ND	ND	ND	ND	ND	No	07323
AP463	21-MA-012-AFT	ALLRMS	NF, BL, 9X9 FT	02/12/90	17	ND	ND	ND	17	Yes	07323
AP464	21-MA-012-AFT	PATCH	NF, BK, 9X9 FT	02/12/90	3	ND	ND	ND	3	Yes	07323
AP465	21-MA-009-AFT	KITCHN	NF, BR, 12X12 FT	02/12/90	<1	ND	ND	ND	<1	Yes	07323
AP466	21-MA-009-AFT	OVERVE	NF, WH, 9X9 FT	02/12/90	2	ND	ND	ND	2	Yes	07323
AP467	21-MA-009-AFT	ALLRMS	NF, GY, 9X9 FT	02/12/90	20	ND	ND	ND	20	Yes	07323

* MATERIAL DESCRIPTION

Friable[1], Color[2], System[3], Type

** RESULTS

CH - Chrysotile
AM - Amosite
CR - Crocidolite
OT - Other
TL - Total

FRIABLE[1]

F - Friable
NF - Non-Friable

COLOR[2]

BK - Black
BL - Blue
BR - Brown
GR - Green
GY - Gray
RD - Red
TN - Tan
WH - White
YL - Yellow

SYSTEM[3]

CHW - Chilled Water
DOM - Domestic Water
HHW - Heating Hot Water
STM - Steam
UNK - Unknown

All analyses are performed in accordance with the methods set forth in U.S. EPA 600/M4-82-020, as ammended. Weston's Optical Microscopy Laboratory is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program for asbestos fiber analysis (Laboratory Code 1254).

ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

Transmission Electron Microscopy
Asbestos Summary Report

Client: Argonne National Laboratories Weston W.O. No.: 2104-13-01-0000

Sample Type(s): Dust and Floor Tiles Sampling Location: Wakefield

QUALITATIVE ANALYSIS

FLOOR TILES: A 0.5 to 2.0 gram portion of each floor tile sample was ultrasonically disaggregated in four milliliters of deionized, 0.2 μm membrane filtered water. After the coarse fraction settled, a drop of the suspended, clay-sized fraction was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined with a Philips CM12 transmission electron microscope operating at 120 kilovolts accelerating voltage.

DUST WIPE SAMPLES: A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated as above and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

ANALYTICAL RESULTS

SAMPLE IDENTIFICATION	RESULTS
AP458-21-MA-011-ATD	Positive
AP459-21-MA-011-ATD	Positive
AP460-21-MA-012-AFT	Positive
AP462-21-MA-012-AFT	Positive

Barry Rayfield
(Approved for Transmittal)

3/13/90
(Date)

* This test report relates only to the specific items tested.
** These sample results may only be reproduced in full, and are valid only if approved for transmittal.